

## Introduction

This report summarizes the results of the Keystone Harbor Study. As directed by the State Legislature in ESHB 2474, Chapter 229, Laws of 2004, Section 304 (see Appendix 1 for the excerpted text of the proviso), Washington State Ferries (WSF) studied a wide range of options for operating out of Keystone Harbor. These options included modifications to the harbor that would accommodate a larger vessel and vessels that could fit in the existing harbor without modifications. After review and analysis of a number of options with participation and input from a Citizen Advisory Group (CAG), WSF selected four options to carry forward for further study.

- Using a 130-car vessel, relocating the jetty 300 feet to the east, and widening the harbor to the east.
- Using a 130-car vessel, extending the jetty 600 feet offshore, and widening the harbor to the west.
- Building new vessels with specialized propulsion systems (assumed for this study to be 100-car sized vessel) for the Keystone-Port Townsend route and using the existing harbor and terminal.
- Building new 65-car “Keystone Special” vessels for the Keystone-Port Townsend route of the same size as the Steel Electrics and using the existing harbor and terminal.

These options represent a range of approaches, but all four keep the Keystone Terminal in Keystone Harbor.

## The Process

As directed by the legislative proviso, a four-person CAG helped guide WSF’s analysis. The CAG was comprised of one tug pilot, one ferry pilot, and two frequent users of the route. Paula Hammond, Chief of Staff for the Washington State Department of Transportation, also attended all meetings. Members of the CAG were officially appointed at the April 2004 meeting of the Washington State Transportation Commission. The group included:

- Captain Tim McGuire, WSF captain on the Keystone-Port Townsend route
- Captain Clark Jennison, tug boat captain based in Port Townsend<sup>1</sup>
- Mayor Nancy Conard, user of the Keystone-Port Townsend route, Mayor of Coupeville
- Forest Shomer, user of the Keystone-Port Townsend route, resident of Port Townsend

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<sup>1</sup> As the study progressed, Captain Jennison experienced schedule difficulties and another tug pilot, T.J. Brennan, attended two CAG meetings as his alternate.



CAG members asked questions and provided input as information was presented at six meetings held between June and December 2004. Members of the public were invited to attend all CAG meetings and to offer comment to WSF and the CAG.

For more details on the CAG meetings and to review the CAG meeting materials, please see Appendix 12. All comments from the public are included in Appendix 11.

## **How were the four options selected?**

The study initially looked at 30 scenarios, developed jointly with WSF staff and CAG members (see Appendix 4 for graphics of all options studied). Each scenario consists of a vessel and a harbor configuration. Two scenarios were eliminated immediately because they were technically infeasible and 28 were carried forward for initial study. Five more scenarios were added for consideration when the jetty relocation option was developed after reviewing preliminary harbor modeling results. In consultation with CAG members, WSF eliminated 16 scenarios at the October 13, 2004 meeting and 13 scenarios at the final CAG meeting on December 7, 2004 from further consideration because of safety and practicality reasons, leaving four options that are recommended for further study. These four options are discussed in detail later in this report. See Appendix 12 for more information on how WSF and the CAG narrowed the harbor/vessel options to these four.

Over the seven months of the study, WSF analyzed traffic, environmental impacts, ridership statistics, safety considerations, costs and benefits, and the physical effects of the various harbor configurations. All options were studied for the period from 2005-2030. Cost estimates were prepared through 2041.

Options that have been considered and discarded during the course of the study include:

- Rebuilding the aging Steel Electrics
- Purchasing an existing vessel currently operating elsewhere in the world for use in Keystone Harbor
- Shifting the vessel slip to the mouth of the harbor to avoid having to navigate into the narrow entrance



## The Keystone Question: Background

The Keystone-Port Townsend ferry route carries 3% of all traffic in the WSF system and is projected to experience a 45% growth in ridership by 2030. Traffic volumes on the route vary widely by season (111,118 riders in August 2003 compared to 34,669 riders the following January).

Although this route is used by relatively few commuters, it is an important cross-sound connection for residents of Port Townsend and Whidbey Island and provides the most direct link between the Olympic Peninsula and the Skagit/Whatcom areas and British Columbia. The route draws commerce related traffic year-round and many tourists in the summer months.

### The Harbor

Keystone Harbor has several features that make it difficult to navigate a ferry into the existing terminal. Strong cross currents frequently make it hard or impossible to enter the harbor's narrow entrance, especially during higher velocity currents at ebb tide.

A recreational boat launch is also located within the small harbor, and a public dive park is near the mouth of the harbor, adding to safety concerns for WSF vessel captains. When operating in high southeast winds, WSF masters have a difficult time staying within the very narrow entrance channel and risk grounding on the western shore of the harbor.



**The Keystone-Port Townsend route carries 3% of all traffic in the WSF system.**





## The Terminal

Limited vehicle holding capacity at the existing terminal and missed sailings due to tides and weather conditions often result in vehicle overflows causing traffic to back-up to the entrance to Fort Casey State Park.

## The Vessels

The 77-year old Steel Electric vessels currently serving the Keystone-Port Townsend ferry route are at the end of their expected service life and are scheduled for retirement. Built in the 1920s, these vessels are the oldest in the fleet and face significant and costly preservation work if they were to remain in extended service. The route is now limited to using the Steel Electric vessels because the beam, length and draft of all other vessels in the WSF fleet makes them unable to navigate into Keystone Harbor's narrow, shallow entrance. For reasons of public safety, operational flexibility, reliability and efficiency, WSF is planning to replace the Steel Electrics with larger 130-car vessels rather than invest in costly preservation work for the Steel Electrics. Through its own analysis, WSF determined that 130-car vessels have the most utility throughout the system, and



therefore are the best vessel to replace older vessels in the fleet. For more discussion of 130-car vessels see Appendix 2.

### ***What is the situation now?***

To examine all possible alternatives for providing service on the Keystone-Port Townsend ferry route, WSF decided to look at sites along Keystone Spit as well as look at possible modifications to Keystone Harbor that would accommodate a larger vessel. In 2003, WSF began an environmental review process, following completion of a feasibility study. The feasibility study focused solely on possible relocation sites, while the environmental review looked at alternate sites as well as options for remaining in the harbor.

In response to public concern over relocation options for the Keystone Terminal, the State Legislature placed a hold on the environmental review process in March 2004. As included in ESHB 2474, the State Legislature directed WSF to convene a Citizen Advisory Group and to conduct a technical analysis that, at a minimum, included the following:

- The costs and benefits associated with preserving and maintaining the terminal, including enlarging the harbor and dredging.
- Ridership projections associated with preserving and maintaining the current terminal.
- Maintaining and retrofitting existing vessels so they can serve the terminal.
- Coordinating the impact of vehicles using the ferry run with highway capacity.
- The number of new vessels, if any, that should be constructed.
- The impact on the environment.

## **What is the outcome of the Keystone Harbor Study?**

The Keystone Harbor Study has identified four options that merit additional study. Each option consists of a combination of a harbor configuration and a vessel option. These are the leading choices that have emerged from the study:

- Using a 130-car vessel, relocating the jetty 300 feet to the east, and widening the harbor to the east.
- Using a 130-car vessel, extending the jetty 600 feet farther offshore, and widening the harbor to the west.
- Building new vessels with specialized propulsion systems for the Keystone-Port Townsend route and using the existing harbor and terminal.
- Building new 65-car vessels of the same size as the Steel Electrics and using the existing harbor and terminal (similar to existing conditions).

### ***Cost***

WSF conducted an economic analysis of different vessel and harbor options. Cost comparisons for all options were prepared to include terminal and vessel construction costs and the subsequent 30-year preservation, maintenance and operating costs. For all



cost options, vessel costs make up over 80% of the total cost in current dollars. Current year dollar cost estimates incorporate the effects of inflation. The cost differences for all but one option are within 10%. The option that is considerably higher in cost (the new 65-car vessel option) is kept as an option for further study in the event that technical and environmental uncertainties associated with any of the other options cannot be addressed.

<b>Option</b>	<b>Estimated Total Lifecycle Cost in Millions of Current (Inflated) Dollars</b>
Using a 130-car vessel/relocating the jetty	\$805
Using a 130-car vessel/extending the jetty	\$824
Building new special propulsion vessels/ using the existing harbor and terminal	\$841
Building a 65-car “Keystone Special” vessel/ using the existing harbor and terminal	\$1,064

See Appendix 5 for the complete cost analysis.

It should be noted that the amount of uncertainty in the details of the cost estimates vary widely among the options. New vessel technology and designs for the new 65-car vessel and the new vessel with special propulsion have higher levels of uncertainty than the known 130-car vessels. WSF does not yet know what environmental mitigation will be required or what the mitigation will cost.

WSF’s current budget assumes funding for construction, operation, maintenance and preservation of four new 130-car ferries. If the decision were made to purchase different vessels for the Keystone-Port Townsend route, additional capital funding for those vessels would be required.

See Appendix 6 for the cost risk analysis.

### ***Key Findings***

In addition to specific findings for each of the four options, which are discussed later in this report, some key study findings apply to all options. These findings will enable WSF to proceed with more information than was available prior to the study and will assist in identifying a course of action for Keystone.

### **Harbor Modeling**

All options that involved modifying the harbor were simulated using state of the art hydrodynamic computer models. A physical model, constructed at Oregon State University, was used to calibrate and validate the computer model (see Appendix 10 for more on how the physical model was constructed and used). Early model results helped WSF develop additional options that were not considered at the beginning of the study.





**Keystone Harbor physical model constructed at Oregon State University**

The computer modeling showed that extending or relocating the jetty makes it technically feasible to bring a larger vessel into Keystone Harbor. Additional research found that the existing jetty was built in 1949 to prevent sedimentation at the entrance of the harbor; it was not built to reduce cross currents or improve ferry operations. The modeling showed that extending or relocating the jetty would not increase sedimentation or maintenance dredging requirements. Additionally, extending or relocating the jetty could reduce cross current velocities at the mouth of the harbor.

Physical and computer modeling were used to analyze the impact of different harbor configurations on the following:

- Cross-channel current velocities
- Wave heights in the channel and harbor
- Sedimentation and maintenance dredging requirements
- Shoreline erosion and bottom scour
- Water quality

Three images on page 12 show the results of computer modeling of current velocities at the entrance to Keystone Harbor for existing conditions, relocating the jetty, and extending the jetty. The blue color indicates low current velocities; high cross current velocities are indicated by red and yellow tones. As indicated by the green and blue

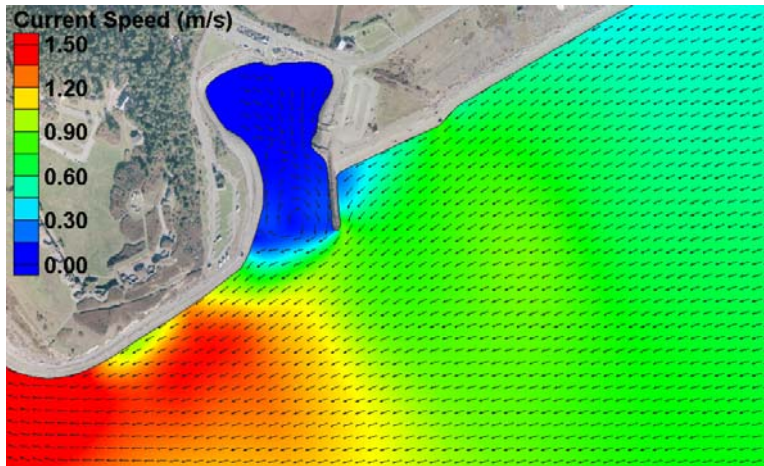


tones at the harbor mouth, current velocities compared to existing conditions are reduced for both options. Lower current velocities extend further from the mouth of the harbor for the jetty relocation option than for the jetty extension option.

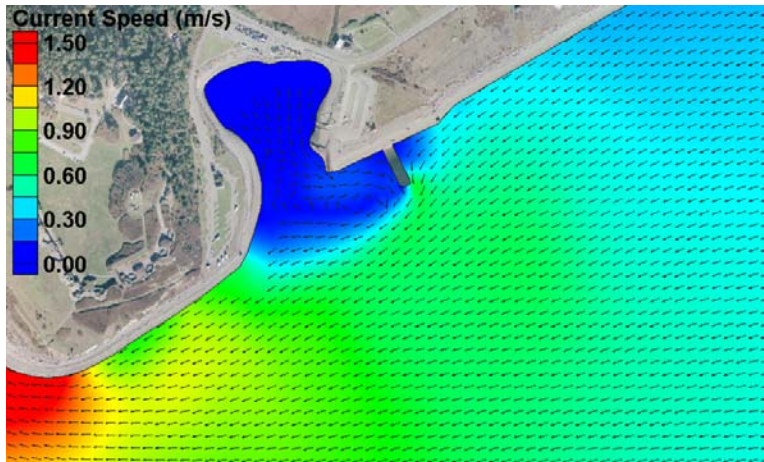
See Appendix 9 for a complete report on results from the physical and computer models of Keystone Harbor.



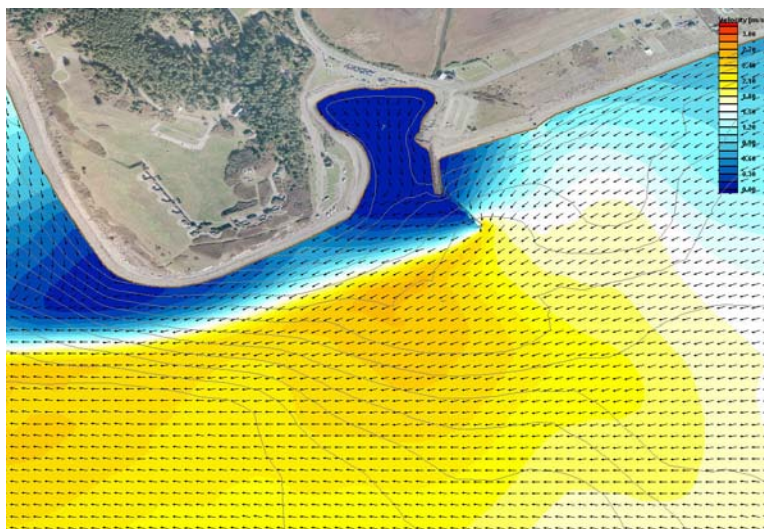
## Computer Modeling of Current Velocities



Existing conditions



Jetty relocation option



Jetty extension option



## **Environmental Considerations**

All options that require substantial modification of the existing jetty may have environmental and permitting issues. However, relocating the jetty would not require any net increase in jetty footprint, jetty materials can be re-used, and the area where the jetty would be removed can be restored. Relocating the jetty would affect the Keystone Conservation Area, a diving park that begins on the east side of the jetty and continues 700 feet down the spit and extends 600 feet out into the water. This effect could possibly be mitigated by reestablishing or expanding the Keystone Conservation Area along the beach. While it is important to preserve the conservation area, the area behind the relocated jetty may provide equal, if not better, conservation measures.

Effects on the surrounding area will be similar for all options. Because all harbor options are located within Ebey's Landing National Historic Reserve, effects on the character of Ebey's Landing would occur for all options. Although a ferry terminal has been located on Keystone Spit since the early 1900s, Ebey's Landing National Historic Reserve was not designated until 1978. Designs for specific options are preliminary, so it is not possible to identify specific impacts.

The level of Crockett Lake is dependent upon its connection with Keystone Harbor. For all options, the terminal and slip remain at or near their existing location, so the long-term connection of Crockett Lake to the harbor remains unchanged from current conditions. No other impacts to Crockett Lake are anticipated for any of the options. All options would provide stormwater treatment, an improvement over the existing conditions. In addition, harbor modeling shows that water quality in the harbor could be improved by relocating the jetty.

See Appendix 7 for further discussion of environmental considerations.

## **Vessel Analysis**

WSF has learned there may be new special propulsion vessels worthy of further study that could operate in Keystone Harbor. Although WSF has reservations about buying a unique class of vessel for a single route, more study of this option is necessary.

There are two harbor options, relocating the jetty or extending the jetty, that appear technically feasible and would allow a 130-car vessel to be brought safely into Keystone Harbor. Results from the physical model confirmed that these options would improve safety and conditions to a point where the harbor is navigable for a 130-car vessel under most weather and tide conditions. WSF masters agree with this assessment.

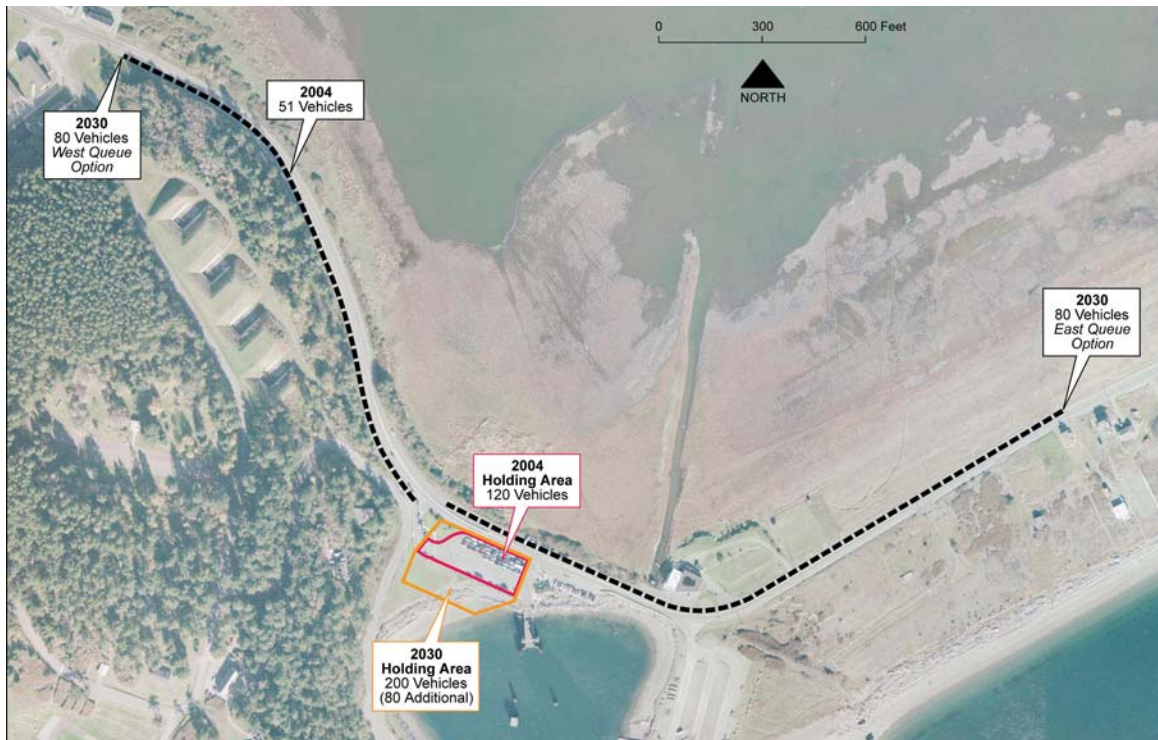
See Appendix 2 for a discussion of 130-car vessels and Appendix 3 for an evaluation of all vessels studied.

## **Vehicle Holding and Queuing Issues at the Terminal**

The size of the holding area is dependent on current and future traffic demand and the frequency of sailings. To accommodate future growth, a 200-car holding area is needed for all four options. The current holding area holds 120 cars and traffic often overflows



to the entrance to Fort Casey State Park. Regardless of which option is ultimately selected, the existing terminal and holding area will need to be improved. Even with an expanded 200-car holding area, traffic back-ups outside the terminal will continue at a level similar to current conditions at most times for all vessel options.



**Current and expanded holding area and 80-vehicle queuing options**

## **Traffic Effects on Local Highways**

Traffic studies for Keystone/Coupeville indicate that by 2030 there will be relatively little difference in traffic impacts at key intersections regardless of the vessel selected. The CAG requested detailed analysis of the impact of various vessel sizes on the local roadway system, in particular the intersection of SR 20 and Main Street in Coupeville. Traffic modeling shows that for all vessel sizes traffic impacts in Coupeville by 2030 will not be significantly different than they would be without ferry traffic. This is largely due to how traffic splits when it leaves the ferry terminal and disperses through the area. For example, as vehicles currently leave the Keystone Terminal, 39% travel east towards SR 525 and 61% travel north towards Coupeville. This distributes the traffic surge and tends to lessen the impact of larger vessels.

Because ferry traffic is a small percentage of total traffic, traffic impacts do not vary significantly for different vessel sizes. This is also due to the frequency of service (i.e. a larger boat will discharge vehicles less frequently than a smaller vessel that carries fewer cars but makes more frequent sailings). Traffic impacts on Keystone/Coupeville should not be a major concern for any of the options recommended for further study. There are some improvements near the terminal that will be needed, including a signal at the terminal exit.

For more on traffic analysis and key findings see Appendix 8.  
Keystone Harbor Study  
Final Report



## Options for Further Study

The four options that are recommended for further study are discussed in greater detail below.

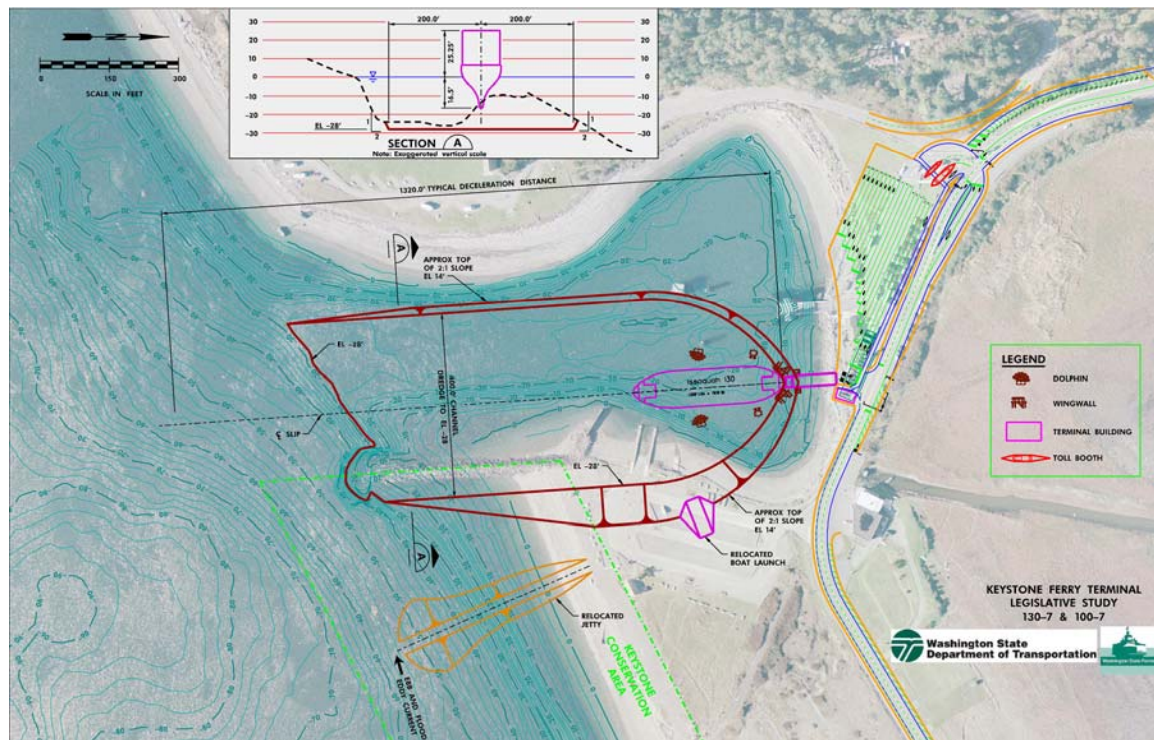
	<b>Using a 130-car vessel/relocating the jetty</b>	<b>Using a 130-car vessel/extending the jetty</b>	<b>Building new special propulsion vessels/using the existing harbor and terminal</b>	<b>Building new 65-car vessels/using the existing harbor and terminal</b>
<b>Vessel Capacity</b>	130 cars	130 cars	100 cars	65 cars
<b>Harbor/Terminal Modification</b>	<ul style="list-style-type: none"> <li>• Relocate existing jetty 300 feet to the east and widen the channel by 200 feet</li> <li>• Deepen the harbor by 3 feet</li> <li>• Realign the terminal slip with the new channel centerline</li> <li>• Relocate the terminal building east of the existing location and add holding capacity</li> </ul>	<ul style="list-style-type: none"> <li>• Extend jetty 600 feet</li> <li>• Widen the harbor to the west 100 feet</li> <li>• Deepen harbor by 3 feet</li> <li>• Expand the holding area adjacent to the existing holding area</li> </ul>	<ul style="list-style-type: none"> <li>• Add holding capacity adjacent to the existing holding area</li> </ul>	<ul style="list-style-type: none"> <li>• Add holding capacity adjacent to the existing holding area</li> </ul>
<b>Number of Vessels Needed by 2030</b>	2	2	2	3



### *Using a 130-Car Vessel and Relocating the Jetty<sup>2</sup>*

For this option, the jetty would be relocated 300 feet to the east and the harbor mouth would be widened to the east 200 feet, resulting in a total channel width of 400 feet. The slip would shift slightly east within the harbor and the holding area would be expanded to alleviate current traffic back-ups and accommodate projected growth. The recreational boat launch would be reconstructed in the harbor and the Keystone Conservation Area would be relocated to include the area to the east behind the new jetty location.

This option was developed after reviewing the results of the physical and computer modeling. The modeling showed that tidal currents were dramatically reduced by relocating the jetty. The currents are moved further offshore leaving more slowing and stopping distance for the ferry and providing a widened channel to allow more room for a 130-car vessel to enter the harbor safely.



### **Using a 130-car vessel and relocating the jetty**

Relocating the jetty would provide a 30% to 50% reduction of cross current velocities at the mouth of the harbor. Although this is less of a reduction than extending the jetty, the reduction would extend much farther out from the harbor entrance. Wave heights in the harbor would increase slightly due to the widened harbor entrance. Sedimentation and maintenance dredging requirements are not expected to increase. In preliminary reviews, WSF masters and port captains preferred this option because of improved safety conditions through the reduction of cross currents.

<sup>2</sup> For discussion purposes, this option was called 130-7. That name was also used in most CAG handouts and other materials. The jetty relocation option was also named Option 7: Existing Slip with Jetty East.



The procurement process for four new 130-car vessels is underway. The estimated cost of one of the new 130-car vessels has been attributed to Keystone in cost comparisons prepared for this study (see Appendix 5). When two vessels would be needed on the route, the cost of the second vessel can be shared among other routes where the vessel acts as a spare or a replacement vessel.

Unlike the jetty extension option, this option would not affect the campground of Fort Casey State Park. Water quality would improve with this harbor configuration, as the residence time for water in the harbor would decrease. Vessel-related environmental benefits include less vessel engine exhaust emissions than the special propulsion vessel systems.

**Key Features of Using a 130-car Vessel and Relocating the Jetty**

<b>Vessel Capacity</b>	130 cars
<b>Harbor/terminal modification</b>	<ul style="list-style-type: none"> <li>• Relocate existing jetty 300 feet to the east and widen the channel by 200 feet.</li> <li>• Deepen the harbor by three feet.</li> <li>• Realign the terminal slip with the new channel centerline.</li> <li>• Relocate the terminal building east of the existing location and add holding capacity.</li> </ul>
<b>Number of vessels needed by 2030</b>	2

### **What work needs to be done on this option?**

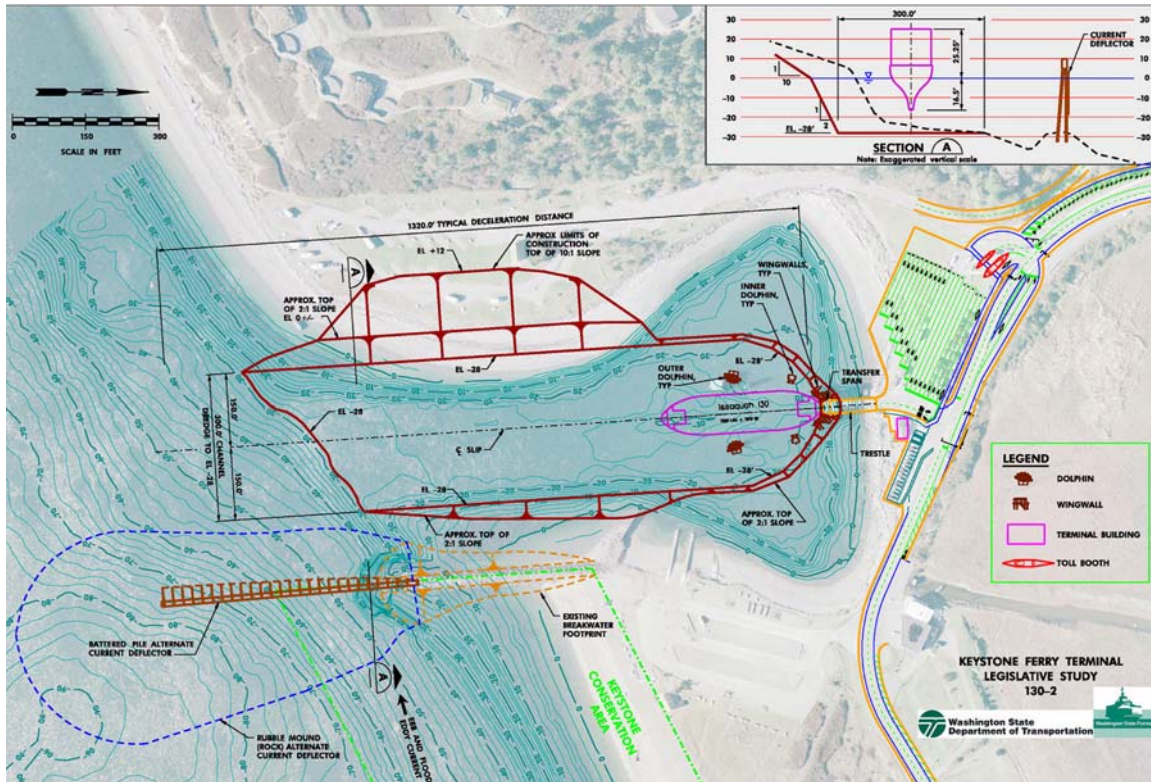
This choice appears very attractive if relocating the jetty is found to be feasible. Further discussions with the U.S. Army Corps of Engineers and other agencies will help determine if moving the jetty is possible from a construction and permitting standpoint. Environmental considerations for this option include effects to the Keystone Conservation Area and issues associated with relocating the jetty. However, there is no net increase in the size of the jetty and existing material may be used, reducing lasting impacts on the harbor.

### ***Using a 130-Car Vessel and Extending the Jetty<sup>3</sup>***

In this option the jetty would be extended 600 feet to help reduce cross current velocities. The harbor mouth would be widened 100 feet to the west, resulting in a total channel width of 300 feet and affecting the campground at Fort Casey State Park. The improved terminal configuration would be near the location of the existing terminal. The existing holding area would be expanded to accommodate 200 cars.

<sup>3</sup> For discussion purposes, this option was called 130-2. That name was also used in most CAG handouts and other materials. The jetty extension option was called Existing Slip with Jetty Extension.





### Using a 130-car vessel and extending the jetty

#### Key Features of Using a 130-car Vessel and Extending the Jetty

<b>Vessel capacity</b>	130 cars
<b>Harbor/terminal modification</b>	<ul style="list-style-type: none"> <li>• Extend jetty 600 feet.</li> <li>• Widen the harbor to the west 100 feet.</li> <li>• Deepen harbor by three feet.</li> <li>• Expand the holding area adjacent to the existing holding area to accommodate projected growth.</li> </ul>
<b>Number of vessels needed by 2030</b>	2

### What work needs to be done on this option?

This option requires more study to assess its technical feasibility and environmental acceptability. It would be difficult to obtain permits for this option because extending the jetty increases the jetty's footprint by five acres, meaning the jetty would increase from a one-acre footprint to a six-acre footprint. However, this option should continue to be studied as a possible alternative if relocating the jetty is found to be infeasible.

As with the jetty relocation, environmental mitigation needs are uncertain and will need to be further analyzed. Widening the harbor to the west to accommodate a larger vessel would affect the camping area in Fort Casey State Park. Potential effects to threatened



and endangered species are considered “very high” for this option due to the jetty extension and additional footprint.

### ***Building New Special Propulsion Vessels for the Keystone-Port Townsend Route and Using the Existing Harbor and Terminal<sup>4</sup>***

WSF has identified potential new special propulsion vessels that are worth studying further. One of the primary characteristics of a new vessel would be a new special propulsion system to provide some of the characteristics needed to operate in Keystone Harbor including: maneuverability, shallow draft, quick response, and room for expanded vehicle capacity. In this option, the terminal would remain in its existing location, no modifications to the harbor would be required, and the holding area would be expanded to handle projected increases in ridership.

#### **Key Features of Building New Special Propulsion Vessels for the Route and Using the Existing Harbor and Terminal**

<b>Vessel Capacity</b>	100 cars
<b>Harbor/terminal modification</b>	Add holding capacity adjacent to the existing holding area.
<b>Number of vessels needed by 2030 (assuming 100-car capacity)</b>	2

### **What work needs to be done on this option?**

Uncertainties about details of the new special propulsion vessel makes the cost estimates for this option less accurate and highly variable. The special propulsion system is new technology for WSF that is untested in the system. This vessel would be a new, special design for which additional risks associated with new technology would need to be quantified further.

This study looked at vessels with special propulsion systems and found that, while maneuverable at slow speeds for landing at Keystone, they are not well suited for crossings such as the trip between Keystone and Port Townsend. The new vessel’s hull characteristics would make for an uncomfortable ride in beam seas. This option needs more study and refinement, as only the most initial considerations about the new special propulsion vessels and their operability have been discussed. Specific areas that require additional consideration include route suitability, crewing and training issues, maintenance, passenger comfort on the open water, and system interchangeability.

Funding for building new special propulsion vessels would need to be established. There is currently no funding identified for the purchase of new, unique vessels for the Keystone-Port Townsend route. These vessels would be of limited utility on other routes

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<sup>4</sup> For discussion purposes, this option was called NP-1. NP-1 or “Out-of-the-Box” was used in most CAG handouts and other materials, referring to this alternative’s goal to think “outside the box” to find a vessel that would work in the existing Keystone Harbor.



because of their unique technology, and the inefficiency of the propulsion system on longer routes. They would also require additional training and crew familiarization.

### ***Building 65-car “Keystone Special” vessels and using the existing harbor and terminal<sup>5</sup>***

This option would include using the existing harbor and terminal with an expanded holding area and building new 65-car vessels with the same footprint as a Steel Electric. The “Keystone Special” vessel would have no utility elsewhere in the system, as its size and speed would not meet service schedules and capacity needs on any other route beyond 2010. WSF does have a limited future need for vessels smaller than 130-car size, but those roles can be filled by the two remaining 87-car Evergreen State Class vessels and the 90-car *M/V Sealth*.

Building new 65-car vessels for the Keystone-Port Townsend route is significantly more expensive than the other options because these vessels are not interchangeable with the existing fleet so all costs are allocated to the Keystone route. The need for three vessels to handle the same demand as two larger vessels also increases cost. For other vessels, the costs can be shared among all routes where the vessels act as a spare or a replacement vessel. This option requires more vessels and/or service hours to meet service demand, which also causes all costs to increase.

#### **Key Features of Building 65-car “Keystone Special” Vessels and Using the Existing Harbor and Terminal**

<b>Vessel capacity</b>	65 cars
<b>Harbor/terminal modification</b>	Add holding capacity adjacent to the existing holding area.
<b>Number of vessels needed by 2030</b>	3

### **What work needs to be done on this option?**

Although this option has a number of problems, WSF feels it is important to continue studying it as a backup in the event that some of the technical issues associated with the other options cannot be resolved.

## **Next Steps**

The Keystone Harbor Study process has led WSF to new, previously unidentified options. Over the seven-month course of this study, a tremendous amount of technical information was gathered and analyzed. WSF has gained more understanding of the concerns of the community, and the community has also learned more about the needs of

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<sup>5</sup> For discussion purposes, this option was called KS-1 or “Keystone Special.” That name was also used in most CAG handouts and other materials. The capacity of this vessel ranged from 65 to 68 cars in technical analyses.



WSF. Even though the options have been narrowed considerably since the study began, all four current options require more technical work and planning before WSF can identify a course of action for Keystone Harbor.

### ***Risk Management***

The following uncertainties may affect the project and will be evaluated as the planning process continues:

- Modifying the harbor, a navigable waterway maintained by the U.S. Army Corps of Engineers, may require authorization by the United States Congress that could delay the terminal project. The last time the harbor was deepened the process took four years from initial request to completion of dredging.
- Neither the new special propulsion vessel nor the “Keystone Special” vessel options are funded. The State Legislature would be required to appropriate or identify other funding if one of these options is chosen.
- Cultural resources may be discovered as part of the construction required to support the widening of the harbor or rebuilding the terminal.

For more on cost range estimates and risk analysis see Appendix 6.

### ***Environmental Review Process***

Because all of the harbor options are within Fort Casey State Park and federal funding is anticipated for the Keystone project, Section 4(f) requirements will apply. Specifically, Section 4(f) requires the analysis of alternatives that avoid impacts to parks, other recreational areas, wildlife or waterfowl refuges, or historic properties. Selection of the avoidance alternative is required if the alternative is determined to be feasible and prudent. Therefore, alternatives outside Keystone Harbor and Fort Casey State Park will need to be considered as part of the environmental review process.

### ***WSF’s Budget and Financial Plan***

The State Department of Transportation’s 2005-2007 budget proposal, approved by the Washington Transportation Commission on August 19, 2004, reserved funding for Keystone Terminal construction pending direction from the 2005 State Legislature. Total terminal project funding in the amount of \$48.6 million was reserved in the Commission’s budget request for the 2005-2015 period, which, depending on the course selected, may not cover all costs.

### ***Vessel Costs***

Common to all cost options was the fact that the vessel costs make up over 80% of the total cost. Because of this, WSF has determined that vessel selection for the Keystone-Port Townsend route is key to cost management.

### ***Using an Interchangeable Vessel on the Keystone-Port Townsend Route***

Four new 130-car vessels are envisioned in the WSF system budget to be built by 2010. There are advantages associated with consolidating the WSF fleet into a smaller number



of vessel classes (with the addition of the four new 130-car vessels there will be a total of nine 130-car vessels in the fleet). The advantages include reduced crew training costs; flexibility for vessel substitution during breakdowns and vessel maintenance periods; and improved maintenance costs, as more vessels of the same class will be able to use the same parts and materials.

On the Keystone-Port Townsend route, capacity could be maintained with only one vessel during the peak season when a second boat is now operating (mid-May through mid-October, mid-morning through late afternoon) and increased during those time periods of the year (mid-October through mid-May) and times of day (early morning and evenings during the summer) when only one Steel Electric is currently operating. WSF often experiences overload traffic conditions during the one-boat schedule on this route on Friday and Sunday evenings and on holidays. This route is projected to experience a 45% growth in ridership by 2030.

### **Challenges to using a 130-car Vessel at Keystone**

Using a 130-car vessel offers a more flexible, interchangeable alternative to building a unique vessel class for a single route. However, substantial modification of the Keystone Harbor itself and modification or relocation of the Keystone dock, terminal building and holding area would be necessary to provide for the 130-car vessels. Because of this, two of the four options WSF will continue to study include other vessel options besides a new 130-car vessel. Neither of these other vessel options is ideal from a system perspective, but they represent alternatives that could work for Keystone.

See Appendix 2 for a complete discussion of 130-car sized vessels.

### ***Technical Studies***

Building on the technical information gained from the harbor modeling, traffic modeling and ridership projections, WSF can move forward with further study of the four options. Additional planning and study work will focus on:

- Vessel characteristics for new special propulsion vessels<sup>6</sup>
- Operational issues and costs associated with each option
- Further discussion and consultation with interested citizens, permitting agencies and tribes on the issues presented by harbor modifications
- Further development of estimated costs
- System-wide impacts of the Keystone decision

WSF will continue to engage the public as further steps are taken to determine the best solution for Keystone Harbor.

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<sup>6</sup> For discussion purposes, throughout the study new vessels were called NP-1. NP-1 or “Out-of-the-Box” was used in most CAG handouts and other materials, referring to this alternative’s goal to think “outside the box” to find a vessel that would work in the existing Keystone Harbor.